

Western



Australia.

DEPARTMENT OF AGRICULTURE.

ROOT ROT OF FRUIT TREES DUE TO *ARMILLARIA*
MELLEAE.

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Armillaria mellea, a fungus of world wide distribution, is perhaps the most important cause of root rot in fruit trees in this State. It is distributed throughout the orchard areas. Citrus trees are particularly affected, though it is also found on stone fruits, apples, pears, grapes, mulberries, passion fruit, and even potatoes.

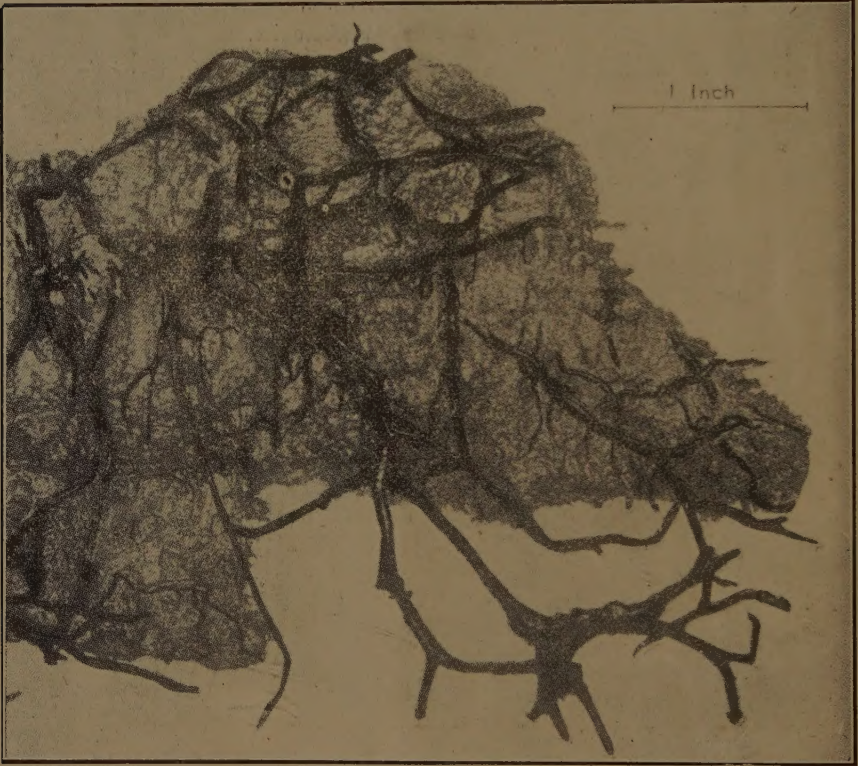


Armillaria mellea fruiting at the base of an orange tree which had been killed by the fungus.

The first indication of root rot is a sickly yellow colour in the foliage and a tendency for the trees to become sluggish and to die back. If the soil is removed and the roots exposed it will be found that some at least of the roots will be rotting to a jelly-like consistency. Black strands will be

found running among the affected roots, half embedded in the tissues in the case of citrus, and running free on the surface in apples and stone fruit. *The presence of these black strands (rhizomorphs) on the roots is a certain guide to the identification of the disease.* If the bark of the affected roots, which becomes soft and loose, is removed, a layer of white fungus will be found between it and the wood. Rotting spreads to the butts and up the stems. In an advanced stage of the disease clusters of mushroom-like bodies may be found, in the autumn and winter, at the base of the stem or where a root has been brought to the surface of the ground. These are yellowish or brown above and whitish on the underside of the cap. The caps may be from one to over six inches across.

When neglected the inevitable end of an affected tree is death.



Rhizomorphs on Nectarine root.

(Photo., N.S.W. Dept. of Agric.)

Methods of Infection.—The principal and most important source of infection is the presence in the soil of roots or stumps of native trees, particularly the Marri or Red Gum (*Eucalyptus calophylla*). This tree has its roots commonly affected with the parasite, which has no apparent bad effect upon its growth. Infection is most likely where land is planted from which green Marri has been recently cleared. Wattles are also very liable to attack and suffer considerably.

Infected trees in an orchard are liable to infect other trees when their roots come in contact. The black strands of fungus pass from one tree to another.

The spores or seed bodies of the mushroom-like fungi may be blown to other trees and start infection.

Effect on Trees.—The fungus causes a rotting of the roots and butts, so that the tree suffers from want of food. Frequently only the roots on one side are affected, and the trees may live for years. In bad cases most of the roots are affected, and the rot spreads to the base of the stems, working round until the trees are ringbarked. Death occurs usually in the dry season.



Rhizomorphs on Citrus roots.
(Photo., N.S.W. Dept. of Agric.)

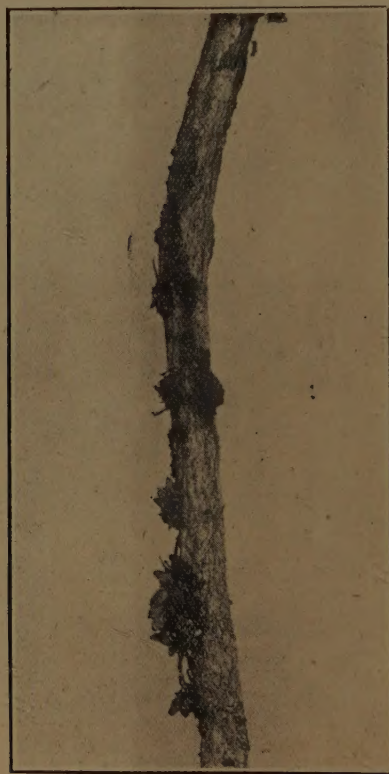
Confusion with Collar Rot.—Root Rot and Collar Rot are often confused. Collar Rot normally develops above the union of stock and scion, and does not extend down to roots. No *rhizomorphs* are developed. Root Rot starts with the roots and spreads up the stem from below ground.

Treatment.—As in all cases of disease, prevention is better than cure. Root Rot in the majority of cases indicates rushed planting in improperly prepared land. It means that stumps have not been properly grubbed or the roots followed up. Where time allows, several crops of cereals or vegetables should be taken off newly cleared land before planting trees, and drainage should be attended to. Bad drainage aids the fungus. Bush drains are, however, dangerous, as they may harbour the pest.

Badly affected trees should be dug up and burned on the spot, and the soil well dressed with quicklime or iron sulphate.

Slightly affected trees should have the soil removed from around the trunk so as to expose the roots. Affected roots should be cut off, followed up and removed. Rotted areas on the stem should be cut away, dusted with iron sulphate, or painted with bluestone paste made as follows:—Bluestone, $1\frac{1}{2}$ lbs.; quicklime, 4 lbs.; water, $1\frac{1}{2}$ gallons. Dissolve the bluestone in portion of the water and the lime in the remainder, and when cold mix to form the paste.

The soil around the tree should be well dressed with iron sulphate. The soil should not all be filled in, a hole about 18 inches from and around the butt of the tree being left open indefinitely. In citrus trees the branches may



Rhizomorphs and young fruiting bodies on Orange root.

also be cut up to about two feet from the ground to allow light to the butts. The idea is to allow access of light and air to prevent rotting, which will not take place when the butts and roots are dry and exposed to light. Trees treated in this manner have lived and borne for years without further apparent effects from the disease.

All *Armillaria* mushrooms should be destroyed when seen. A dusting of iron sulphate will kill them readily.